TT418A: DTCs P2135 and P2101 Theory and Diagnostics

January 7, 2011

Electrical

APPLIES TO	SYMPTOMS
2008-Later Touring, Police and Trike Models	• Driveability or Performance Concerns • Abnormal or Erratic Mechanical Operation • Intermittent or Erratic Electrical Operation

DTC P2135

General Information

Read this general information to better understand what can set Diagnostic Trouble Code (DTC) P2135 in the Electronic Control Module (ECM). After the general information, you will find information about possible root causes and tips for diagnosing and repairing affected vehicles.

NOTE

Throttle Position Sensor (TPS) circuit DTCs P0120, P0220, P0122, P0123, P0222 and P0223 should take diagnostic priority over a P2135 code. If any of these TPS codes exist concurrently with the P2135, they should be investigated first using the electrical diagnostic manual.

The Throttle Control Actuator (TCA) contains two potentiometers (designated as TPS1 and TPS2) and an electric DC motor for controlling the actuation of the throttle. The two TPS sensors work opposite of each other. As the throttle plate opens, TPS1 voltage ranges from 0.0-5.0 Volts (V), while TPS2 voltage ranges from 5.0-0.0 V. The sum of the two TPS voltages should always measure approximately 5.0 V. These wires are: TPS1, pin 37 (BN/V wire) of the ECM, and TPS2, pin 36 (BN/R wire) of the ECM.

The TPS 1 and 2 sensors should never add to more than 5.13 Volts Direct Current (VDC) or less than 4.87 VDC. A sum of voltages out of this range should register a current P2135 code.

Troubleshooting

It is believed that fretting corrosion is a major contributor to this code. A poor connection at the TCA can affect the sensor voltages reported to the ECM and set this DTC. As you can see from the General Information section, the sensor voltage only needs to be altered by 0.13 VDC to possibly set the code.

The most common vehicles to have these symptoms are those with more than 8000 miles (12,875 kilometers), or 103 cubic inch (1680 cubic centimeters) and larger engines. Vibration is believed to contribute to the fretting condition.

Repair Procedure

1. While monitoring the TPS1 and TPS2 voltages on Digital Technician II (DT II), wiggle the TCA [211] and the ECM [78] connectors.
2. If the voltage changes while wiggling the ECM connector, replace the affected ECM terminals (Part No. 72605-08). These wires are: TPS1, pin 37 brown/violet (BN/V) wire of the ECM, and TPS2, pin 36 brown/red (BN/R) wire of the ECM.
3. If no voltage change is noted while moving the ECM connector, the connection issue could be in the TCA. Replace all socket terminals with **new** terminals (Part No. 72663-11, used in current production) at the TCA connector [211B] .

4. Before connecting the TCA connector, clean the male TCA pin terminals with a swab and alcohol, and assemble with dielectric grease (Part No. 99861-02, Nyogel 760G).

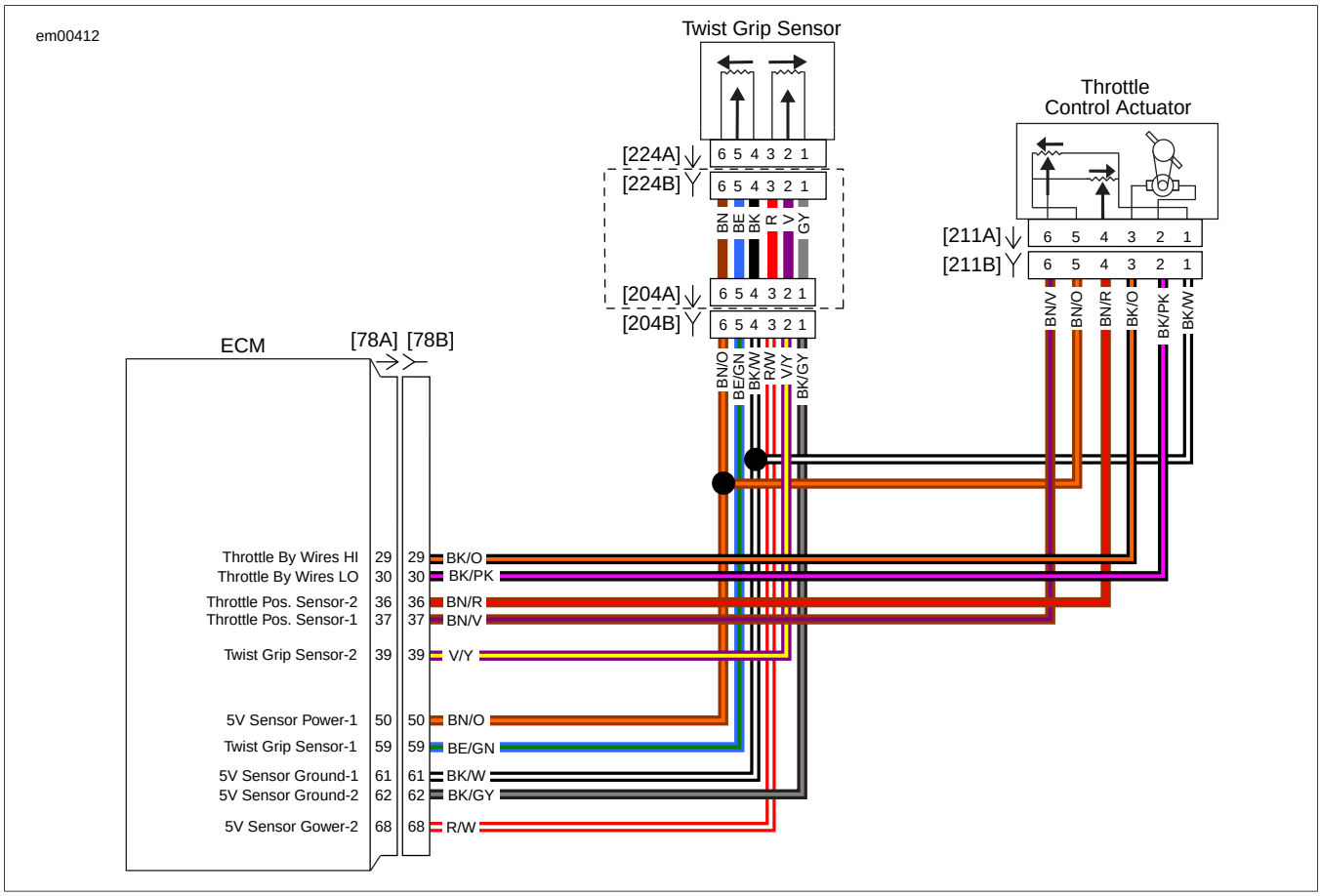

Figure 1. TCA Circuit Schematic

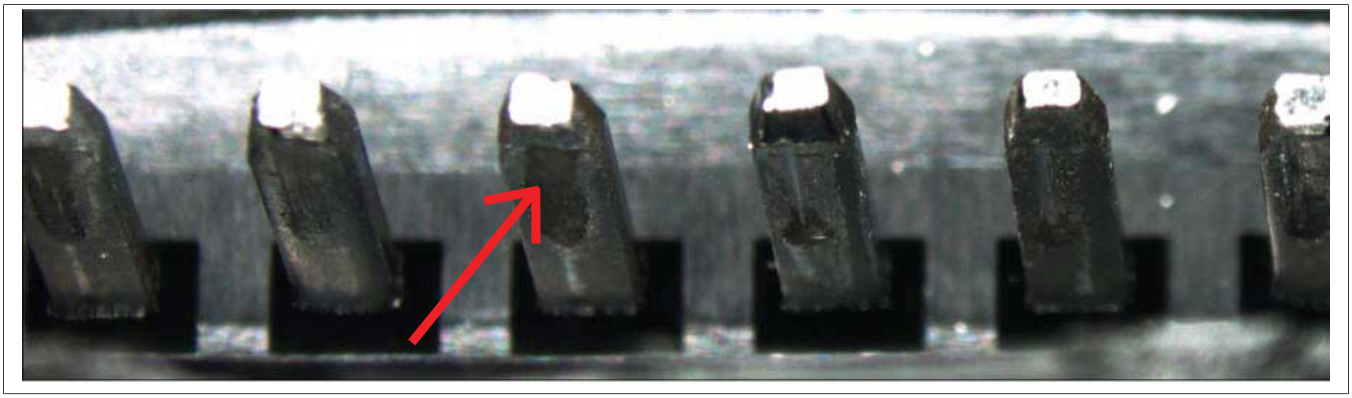

Figure 2. Example of Terminal Fretting

DTC P2101

General Information

The TCA contains two potentiometers (designated as TPS1 and TPS2) and an electric DC motor for controlling the actuation of the throttle. TPS1 and TPS2 are mounted in the TCA. They are connected to the keyed shaft of the throttle plate and used to communicate the throttle plate position.

Each TPS supplies input to the ECM in response to the position of the throttle plate. The ECM activates the motor in the TCA to move the throttle plate, based on signals from the Twist Grip Sensor (TGS). When the ECM sends voltage modulations to pins 2 and 3 of the TCA to move the throttle motor, it checks for subsequent TPS1 and TPS2 voltage changes. If it does not sense TPS changes, it can set this code.

Troubleshooting

First verify that the throttle plate moves freely when the engine is not running. If it does not, the TCA should be replaced.

Poor ECM connections seem to be the most likely cause. Be aware that this issue may be aggravated by the seat pan making contact with the ECM connector. In most cases, this is caused by the installation of an aftermarket seat.

A poor connection at ECM pins 29 and 30 could cause an interruption in voltage to the throttle motor and set this code. Similarly the ECM uses voltage from pin 52 yellow/green (Y/GN) wire to supply power used at pins 29 and 30 and could cause the same symptoms.

Repair Procedure

Identifying connection issues at this location may be difficult.

1. Replace all socket terminals with **new** terminals (Part No. 72663-11, used in current production) at the TCA connector [211B].
2. Before connecting the TCA connector, clean the male TCA pin terminals with a swab and alcohol, and assemble with dielectric grease (Part No. 99861-02, Nyogel 760G).